UNIVERSIDADE DE SÃO PAULO
FACULDADE DE ODONTOLOGIA DE BAURU

OLGA BENÁRIO VIEIRA MARANHÃO

**Comparison of microesthetic patterns in normal occlusion in
relation to Class I malocclusion treated with extractions of four
premolars**

**Comparação dos padrões de micro-estética na oclusão normal em
relação à Classe I tratada com extrações de quatro pré-molares**

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Orientador: Prof. Dr. Guilherme Janson

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ABSTRACT

COMPARISON OF MICROESTHETIC PATTERNS IN NORMAL OCCLUSION IN RELATION TO CLASS I MALOCCLUSION TREATED WITH EXTRACTIONS OF FOUR PREMOLARS

Introduction: The aim of this research was to compare the microesthetics characteristics of the maxillary anterior tooth in individuals with Class I malocclusion treated with four premolars extractions in relation to normal occlusion as well the evaluation of symmetry between right and left sides in both groups. **Methods:** The sample was divided into two groups, first one with Angle Class I malocclusion treated with four premolars extraction (mean age of 15.18 and composed by 22 female and 9 male patients), and second one with Normal Occlusion (mean age of 16.93 and comprised by 15 female and 16 male individuals) composed by 31 individuals each. Objective grading system index (OGS) was evaluated in the plaster models of both groups and then digitized in 3D 3Shape R700 scanner (3Shape A/S, Copenhagen, Denmark). The width/height proportion of anterosuperior teeth, zenith location, height of connectors and gingival contour were measured with OrthoAnalyzer™ 3D program. Random and systematic errors were respectively evaluated with Dahlberg's formula and paired t tests. Mann-Whitney U and t tests were applied to variables without and with normal distribution respectively. **Results:** In most comparison there was no significant differences between groups. It was noticed in a few situations that Class I group presented significantly greater width/height proportion in 12 than Normal Occlusion; significantly smaller gingival zenith of 23, significantly greater connector in 22 to 23 and also significantly greater gingival contour in right side in comparison to Normal Occlusion group. Both sides of Class I and Normal Occlusion groups presented symmetry. **Conclusion:** Four premolar extractions orthodontic treatment of Class I malocclusion provides similar microesthetic patterns as individuals with normal occlusion. Both groups generally present symmetric microesthetic characteristics.

Keywords: Dental Esthetics; Orthodontics; Malocclusion, Angle Class I.

RESUMO

Comparação dos padrões de micro-estética na oclusão normal em relação à Classe I tratada com extrações de quatro pré-molares

Introdução: O objetivo desta pesquisa foi comparar as características de microestética nos dentes anterossuperiores em indivíduos com má oclusão de Classe I tratados com quatro extrações de pré-molares em relação à oclusão normal, bem como a avaliação da simetria entre os lados direito e esquerdo em ambos os grupos. **Métodos:** A amostra foi dividida em dois grupos, o primeiro com pacientes com má oclusão de Classe I de Angle tratados com extração de quatro pré-molares (idade média de 15,18 e composta por 22 pacientes do sexo feminino e 9 do sexo masculino) e um com Oclusão Normal (média de 16,93 e composto por 15 indivíduos do sexo feminino e 16 do sexo masculino) compostos por 31 indivíduos cada. O Objective Grading System Index (OGS) foi avaliado nos modelos de gesso dos dois grupos, os quais foram digitalizados em seguida no scanner 3D 3Shape R700 (3Shape A / S, Copenhagen, Dinamarca). A proporção largura / altura dos dentes anterossuperiores, a localização do zênite, a altura dos conectores e o contorno gengival foram medidos com o programa OrthoAnalyzer™ 3D. Erros casuais e sistemáticos foram avaliados respectivamente com a fórmula de Dahlberg e testes t pareados. Os testes U e t de Mann-Whitney foram aplicados às variáveis sem e com distribuição normal, respectivamente. **Resultados:** Na maioria das comparações não houve diferenças significativas entre os grupos. Percebeu-se que o grupo com Classe I apresentou proporção de largura / altura significativamente maior no incisivo lateral direito em relação à oclusão normal; zênite gengival significativamente menor no canino esquerdo, significativamente maior no conector entre o incisivo lateral esquerdo e canino esquerdo, e significativamente maior no contorno gengival do lado direito em comparação ao grupo de oclusão normal. Ambos os lados dos grupos Classe I e Oclusão Normal apresentaram simetria. **Conclusão:** O tratamento ortodôntico com extrações de quatro pré-molares da má oclusão de Classe I fornece padrões microestéticos semelhantes aos indivíduos com oclusão normal. Ambos os grupos apresentaram simetria na maioria das características de microestética.

Palavras-chave: Estética dentária; Ortodontia; Má oclusão, Classe I de Angle.

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1 INTRODUCTION

1 INTRODUCTION

During centuries Orthodontics was based in correction of malocclusions and in recovery of correct dental relationship. (SARVER; ACKERMAN, 2003) Although recently the relationship between occlusion, smile and esthetics have been inserted in that field aiming the improvement of orthodontic finishing and to fulfill esthetic requirements of patients. (SARVER; ACKERMAN, 2003; JANSON et al., 2011; TAUHEED; SHAIKH; FIDA, 2012) It can be explained by propagation of beauty patters by the media which leads patients to a higher degree of requirement in dental office. (MACHADO, 2014) Thereby it is necessary a more dynamic orthodontic treatment plan and to know dental and gingival esthetics concepts.

Thereby, esthetics in orthodontics can be divided into three areas: microesthetics, miniesthetics and macroesthetics. (SARVER, 2004; SARVER; JACOBSON, 2007) First one is related to dental size proportion, dental shape, color, contact points, connectors and periodontal characteristics (zenith and gingival contour) (Figure 1). (SARVER; ACKERMAN, 2005; SARVER; JACOBSON, 2007) Meanwhile miniesthetics is related to relationship between teeth and other oral structures with the smile (eg. buccal corridor, smile arch, degree of incisor exposure); while macroesthetics considers the face and its harmony and proportion. (SARVER; ACKERMAN, 2005; SARVER; JACOBSON, 2007; SARVER, 2011)

In classical study about dental size proportion it was defined that lateral incisors presented 78% of central incisors width and 87% of canine width; while canines had 90% of upper central incisors width. (GILLEN et al., 1994) Regarding gender, the female commonly presents larger teeth in relation to male, although there are no significant differences between height and width in both genders. (STERRETT et al., 1999) Through this proportion, can be noticed that central incisors are used as parameter to stablish esthetical conditions in others anterior teeth; thus some articles evaluated clinical crown height mean, which varied of 9.5 to 11mm. (RUFENACHT; BERGER, 1990; CHICHE; PINAULT, 1994; WALDROP, 2008; MACHADO, 2014)

In relation to red esthetics, is considered gingival contour adequate and pleasant when gingival margin of central incisors are in same level of canines, while in lateral incisors they are presented 1mm under the first ones. (KOKICH; NAPPEN;

SHAPIRO, 1984; CHU et al., 2009; MACHADO, 2014) Another acceptable disposition consisting of canines gingival margins 1mm above central and lateral incisors whilst in four upper incisors is in same level. (MACHADO, 2014) Besides it is expected a partial exposure in gingival contour during smile, as well the patient might present in consequence younger smile and esthetically pleasant. (MACHADO, 2014; MACHADO et al., 2016)

Other aspect considered in microesthetic is gingival zenith, which is defined as most apical point of gingival contour in anterior teeth. Thus is recommended that in central incisors and in upper canines the zenith might be positioned distally to the center of the crown, while in lateral upper incisors and lower incisors it might be positioned in the apex of these tooth. (RUFENACHT; BERGER, 1990; GÜREL; GÜREL, 2003; SARVER, 2004) In a more specific field, it was determined that the positioning of gingival zenith in relation to center of the clinical crown was 1.1; 0.4 and 0 mm to central incisors, lateral incisors and canines respectively. (CHU et al., 2009)

Zenith position might be influenced and modified by orthodontic treatment through second order bends inserted in anterior region. (BRANDÃO; BRANDÃO, 2013) This mechanic changes dental angulation and consequently moves zenith. (BRANDÃO; BRANDÃO, 2013) Other way to do this modification is through differential bonding to mesiodistal position of brackets. (BRANDÃO; BRANDÃO, 2013) Because it is located in an esthetic region, it is important that the orthodontist, periodontist and prosthesis maintain symmetrical gingival zeniths.

The papilla is another structure that confers esthetics to the smile and must be present in the aesthetic evaluation by the orthodontist. (BRANDÃO; BRANDÃO, 2013) Ideally is located from interdental niche to contact point. Thereby the use of orthodontic interventions as interproximal stripping and alterations in dental angulation aiming the correction of different malocclusions might influence the localization of papilla and, consequently, in smile esthetic.

Contact point is the exact site where tooth touch each other, and connectors involve areas where tooth apparently present contact. (SARVER, 2004) In conditions of dental and periodontal health, the tooth contact points are progressively positioned apically from midline to posterior tooth. (SARVER, 2004) In contrast, connectors extension is bigger in tooth closer to midline and reduce progressively, so that in central incisors their extension correspond to 50% of these tooth height, in lateral s 40%

central incisors height, and canines correspond to 30% incisors height. (MORLEY; EUBANK, 2001; SARVER, 2004, 2011; TAUHEED; SHAIKH; FIDA, 2012; BRANDÃO; BRANDÃO, 2013) The modification in these percentages might result in the arise of black triangles between anterior tooth. (MACHADO, 2014)

To make this evaluation correctly and with less chances of measurements errors is important to associate analysis of patient documentation and their plaster models with technology, which is been doing nowadays with the use of digital casts in researches. (FLEMING; MARINHO; JOHAL, 2011; ABIZADEH et al., 2012; GREWAL et al., 2016) Digitalization of plaster models allows them to be easily evaluated in different perspectives and periods without risk of loss or breakage of this documentation. (GREWAL et al., 2016)

Besides, static analysis of dental and periodontal characteristics can be done through programs of image edition, that complements the evaluation with plaster models and contributes to obtainment of more reliable results and with less risk of bias. (TAUHEED; SHAIKH; FIDA, 2012; OLIVEIRA et al., 2015; EDUARDA ASSAD DUARTE et al., 2017)

Besides proportion of dental and red esthetics is well described in literature, especially in dental esthetic, periodontics and prosthesis areas, there is no parameter or scientific proper description of numerical values in normal occlusion and in Class I malocclusion. (WOLFART et al., 2005; WALDROP, 2008; CÂMARA, 2010; TAUHEED; SHAIKH; FIDA, 2012) Therefore most of scientific papers related to it is limited to include in their study samples patients considered with pleasant esthetic, without diastema or crowding; but normal occlusion or different malocclusions are not studied.

The lack of researches limits the application of these principles in Orthodontics and justify the development of this research, since the professional of this area deals with different occlusal relationships that may limit orthodontic finishing and refinement, thus preventing the achievement of the recommended parameters for microesthetics.

2 ARTICLE

2 ARTICLE

The article presented in this Dissertation was formatted according to the American Journal of Orthodontics and Dentofacial Orthopedics instructions and guidelines for article submission.

COMPARISON OF MICROESTHETIC CHARACTERISTICS IN CLASS I MALOCCLUSION TREATED WITH EXTRACTIONS OF FOUR PREMOLARS IN RELATION TO NORMAL OCCLUSION

Abstract:

Introduction: The aim of this research was to compare the microesthetics characteristics of the maxillary anterior tooth in individuals with Class I malocclusion treated with four premolars extractions in relation to normal occlusion as well the evaluation of symmetry between right and left sides in both groups. **Methods:** The sample was divided into two groups, first one with Angle Class I malocclusion treated with four premolars extraction (mean age of 15.18 and composed by 22 female and 9 male patients), and second one with Normal Occlusion (mean age of 16.93 and comprised by 15 female and 16 male individuals) composed by 31 individuals each. Objective grading system index (OGS) was evaluated in the plaster models of both groups and then digitized in 3D 3Shape R700 scanner (3Shape A/S, Copenhagen, Denmark). The width/height proportion of anterosuperior teeth, zenith location, height of connectors and gingival contour were measured with OrthoAnalyzer™ 3D program. Random and systematic errors were respectively evaluated with Dahlberg's formula and paired t tests. Mann-Whitney U and t tests were applied to variables without and with normal distribution respectively. **Results:** In most comparison there was no significant differences between groups. It was noticed in a few situations that Class I group presented significantly greater width/height proportion in 12 than Normal Occlusion; significantly smaller gingival zenith of 23, significantly greater connector in 22 to 23 and also significantly greater gingival contour in right side in comparison to Normal Occlusion group. Both sides of Class I and Normal Occlusion groups presented symmetry. **Conclusion:** Four premolar extractions orthodontic treatment of Class I malocclusion provides similar microesthetic patterns as individuals with normal occlusion. Both groups generally present symmetric microesthetic characteristics.

Keywords: Dental Esthetics; Orthodontics; Malocclusion, Angle Class I.

Introduction:

Dental esthetics has been divided into three areas: macroesthetics, miniesthetics and microesthetics.^{1,2} The first is related to face proportion and harmony.^{1,3} The second comprises smile design and its relation with other oral structures, such as buccal corridor, degree of incisor exposure upon smiling and smile arch.^{1,3} Finally, microesthetics refers to white and red esthetics. Dental features include shape, crown proportion and color; while periodontal characteristics comprises connectors, zenith and gingival contour.^{1,3,4}

Quantitative parameters related to microesthetics has been reported.^{1,2,5-7} Lateral incisors should present 78% of central incisor and 87% of canines widths, meanwhile canines should have 90% of central incisor width.⁶ The central incisor has been frequently described as pattern to determine maxillary anterior esthetics. Usually, the gold standard values for the upper incisor crown height range from 9.5 to 11 mm.^{5,8-11}

Regarding to gingival zenith, a distal position of this periodontal measure is acceptable for central incisors and canines; and, for lateral incisors, it should be coincident to the center of the dental crown.^{2,5,8,12} In healthy conditions, a progressively apical position of connectors is accepted from the midline to posterior teeth. Based on the total maxillary incisor height as parameter, 50% of this measure should be considered for the connector between central incisors, 40% between central and lateral incisors and 30% between lateral incisors and canines.^{2,13,14} Finally, the same level of gingival margins of the central incisors and canines along with a 1 mm more incisal margin for the lateral incisors are considered pleasant.^{2,5,13-15}

It has been described that orthodontic treatment could influence microesthetics characteristics.^{13,16,17} Different mesiodistal bracket bonding and second order bends could alter teeth angulation and consequently the gingival zenith.^{12,13,16} In some treatments with space discrepancies, interproximal reduction is performed and this could alter teeth width/height proportions,^{13,16} and increase gingival connectors.^{7,13,15} Gingival contour might be changed through orthodontic extrusion or intrusion, since the gingival margin follows vertical dental crown displacements.^{5,13-15}

Most of the studies regarding microesthetics in Orthodontics do not detail the description of initial malocclusion classification or the inclusion of individuals with normal occlusion.^{6,18-20} It seems important to deeply understand if orthodontic

treatment results on different microesthetics characteristics than those naturally observed in normal occlusion patients.

Based on this, the aim of this research was to compare the microesthetics characteristics of the maxillary anterior tooth in patients with Class I malocclusion treated with four premolar extractions in comparison to individuals with normal occlusion, as well the evaluation of symmetry between right and left sides in both groups.

Material and methods:

This study was approved by the Ethics in Research Committee of xxx (process number CAAE 84325318.2.0000.5417).

Sample size was calculated with a significance level of 0.05 and 80% of test power, considering a minimum intergroup difference of 0.1 mm based in minimum alterations perceived of orthodontists²¹, using a standard deviation of 0.11 in the width/height proportion variable previously reported.²² Thus, a minimum of 20 individuals were required on each group.

The sample was divided into two groups retrospectively selected from the files of a Dental School. The Class I group was composed by 31 patients with Class I malocclusion treated with four premolar extractions (mean age of 15.18, comprised by 22 female and 9 male patients). The Normal Occlusion group was comprised by 31 individuals with normal occlusion (mean age of 16.93 and comprised by 15 female and 16 male). Inclusion criteria involved individuals with tight interproximal contact points, absence of upper crowding and midline deviations, lower crowding smaller than 2mm, adequate interincisal relationship (with no size discrepancies or accentuated or reduced overjet and overbite), and Class I molar relationships.^{23,24} Patients with syndromes or labial/palatal cleft, agenesis or teeth loss, supernumerary teeth, upper diastemas, anterior crowding, anterior open bite, crossbite or with any periodontal alteration (gingival recession, gingival inflammation or bone loss) or with and OGS up to 35 points were excluded.

The same examiner (O.B.V.M) performed all measurements of this study, then initially, the objective grading system (OGS) index was evaluated in the plaster models of both groups to analyze the finishing quality in the Class I group and the quality of

normal occlusion. Then the models were digitized with 3D 3Shape R700 scanner (3Shape A/S, Copenhagen, Denmark) and analyzed in OrthoAnalyzer™ 3D software (3Shape A/S, Copenhagen, Denmark). The width/height anterior dental crown proportion, height of gingival zenith, extension of dental connectors and height of gingival contour were evaluated in the six upper anterior teeth. No occlusal plane was inserted in the plaster models in order to do not interfere in measurements during the insertion of variables points.

The width was measured as the distance between the most mesial and distal points of the dental crowns. Height was measured as the distance between the most gingival and incisal points of the dental crowns. Then, the width/height proportion was established (Fig. 1A and B).²²

The gingival zenith was analyzed as the distance between the most apical point of the clinical dental crown in contact with the gingiva to the most cervical point of the center of the clinical crown (Fig.2).²² Positive values indicated distal position and negative values indicated mesial position of the gingival zenith.

The connectors were evaluated as the distance between the limit of papillae and the contact point (Fig. 3).²²

The gingival contour was analyzed as the perpendicular distance from the most cervical point of the lateral incisor crown to a line passing through the most cervical points of central incisor and canine drawn on each side (Fig. 4).²²

Error study

Digital models were re-analyzed in 30% of sample after a month interval in a randomly selection, and all measurements were made by the same researcher (O.B.V.M.). Systematic and random errors were evaluated with paired *t* test and Dahlberg's formula, respectively.²⁵

Statistical analyses

Normal distribution of the sample was analyzed with Kolmogorov-Smirnov test. Intergroup comparisons were performed with *t* tests for almost all variables in exception of age and gingival zenith of 23 that were evaluated with Mann Whitney U tests.

Paired t test was used to compare right and left side values in both groups. Statistical analyses were carried out in the Statistica software (Statistica for Windows version 7.0; StatSoft, Tulsa, Okla) Results were considered significant at $P < 0.05$.

Results

The random errors of dental cast measurements ranged from 0.01 (width/height of 21) to 2.98 (OGS).²⁶ Systematic error was found only in gingival zenith of left central incisor and connector of right canine to right lateral incisor. Groups were comparable regarding age and OGS values.

Digital models measurements showed that Class I presented statistically significant higher width/height proportion in RLI than normal occlusion group (Table I). Additionally, Class I group presented: significantly smaller distal position of the gingival zenith of LC, significantly higher values in LLI to LC connector, and significantly greater gingival contour in the right side in comparison to Normal occlusion group (Table I).

Intragroup comparisons showed that in the Class I group, the width/height proportion of the right canine was significantly greater than the other side; and the gingival zenith of right central incisor was significantly smaller than left side (Table II). In Normal Occlusion group, the width/height proportion was statistically significant greater in upper right central incisor in relation to contralateral side (Table III).

Discussion

Esthetics is commonly studied in dentistry, especially focused to dental proportion, smile and periodontal parameters. Although orthodontics is directly related to dental esthetics, and the relation between malocclusion treatments and microesthetics is not frequently described. Previous studies reported microesthetic characteristics in orthodontics but the presence of malocclusion or its classification is not usually specified.^{1,2,14,22,27} Consequently, the relationship between orthodontic treatment and changes in esthetic characteristics has not been established. In addition, microesthetics comparisons between orthodontically treated patients and untreated normal occlusion individuals has not been reported. Thus, the present study reports a new and important topic in relation to orthodontics and microesthetic.

Generally, normal occlusion individuals are considered to have adequate good occlusal relationship and no need of orthodontic treatment²⁴ and are used as a gold standard in orthodontics. Then, it could be expected the presence of normal characteristics of microesthetics, as well. Class I malocclusion patients treated with four premolar extractions present moderate to accentuate orthodontic problems mainly in the anterior region and mechanics are focused in this area.²⁸

Digital models were used in this study to measure the microesthetics variables since they allow an accurate and easier way to evaluate and reproduce measurements when the examiner is well calibrated.^{29,30} This method was chosen in this study because it allows the image magnification of the structures that need to be precisely evaluated in microesthetics.

Although the OGS index has been frequently used to analyze the quality of orthodontic treatment finishing,³¹ it was also applied in the Normal Occlusion group of this study to make the groups comparable regarding to occlusal quality.³² One limitation of this study was the absence of panoramic radiographs in Normal Occlusion group. Then, the root angulation parameter from the OGS was excluded in this evaluation. This behavior has been previously reported.³² Other indexes are available to evaluation of occlusion and esthetic, as DAI (Dental Aesthetic Index), although OGS index is a well described, reliable and largely used in orthodontics.

Because it is a very strict index, even small alterations considered clinically acceptable might result in loss of points denoting in high OGS scores. Alignment was the criteria with greater discrepancies during the evaluation, probably because 28 teeth are individually analyzed, while most of other items consider only segments of dental arches or the relation between them in occlusion.³¹ This could explain the higher values of OGS index in both groups (Table I). This finding has been described in other researches that evaluated the OGS index in untreated and well treated cases.³²⁻³⁵

In this study, greater width/height proportions were found compared with those from previous researches.^{6,22,26} This may be explained because the widths of the subjects included in this study were larger and consequently influenced the width/height proportion in anterior upper teeth. This could be considered an inherent characteristic of the sample. Factors such as measuring devices (digital casts, digital caliper), mean age of sample and also race characteristics might have explained this discrepancy.^{22,36} It could be argue that sex might also influence in this proportion. However it has been reported that this variable only showed significantly changes in

the late growth period (40th decade of life), while no significant effects has been reported in young adults.^{26,37} Since patients in this study were young adults, influence of sex could not be expected.

In general, no statistically significant differences in width/height proportion were found between groups, with the exception of the right lateral incisor that had significantly smaller proportion in the Normal Occlusion group (Table IV). Nevertheless, this difference could be considered without clinical significance because in general dentists and laypeople do not perceive microesthetics alterations of less than 1mm.^{5,12,38}

The lack of difference between groups for width/height proportion could be explained because, this rarely change with orthodontic treatment. This could happen when associated to periodontal intervention, in case of orthodontic extrusion followed by periodontal surgery. Another factor that may influence this proportion is the cervical migration of gingival margin associated with orthodontic treatment.^{39,40} However, these factors were not observed in the patients evaluated in this study.

A distal position of the gingival zenith was similarly observed in all upper anterior teeth in both groups, which partially corroborates with previous studies.^{2,8,14} An esthetical gingival zenith position was described for those placed distally to the long axis of the central incisor, lateral incisor and canine clinical crown.⁴¹ Although it is also accepted a distally position in the central incisor and canine, while gingival zenith of lateral incisor should coincide to clinical crown long axis.^{2,8}

The gingival zenith of the upper left canine was significantly more distally positioned in the Normal occlusion group (Table I). In general canines of both groups presented gingival zeniths nearest to clinical crown long axis. Despite some differences, it has been reported that both positions (distally or centered with long axis) are esthetically accepted.⁵

The gingival connectors showed smaller values than previously reported.^{2,13,14} Nevertheless, they maintained the progressively decrease from anterior to posterior region, as previously established.^{2,5,13} In summary connectors between upper central incisors must have 50% of central incisor height, 40% of the central incisor height should be found between central to lateral incisors, and 30% between lateral incisor to canine connection.^{2,13,14}

The connector between the left lateral incisor and left canine was significantly smaller in the Normal Occlusion group. Nonetheless, this value did not affect the

proportions mentioned above.^{2,13,14} This unilateral difference may be related to the orthodontic treatment or patient inherent characteristics in this group. However, this difference was about 0.6 mm and could have not been considered clinically significant.^{12,42}

As reported for the gingival zenith and connectors, orthodontic treatment might influence gingival contour displacement.^{2,7,13-15} The gingival contour of the upper right lateral incisor was significantly greater in the Class I group (Table I), this means that the gingival margin was located more incisal than in Normal Occlusion group. It was probably explained as a consequence of the significantly greater width/height proportion observed for the upper right lateral incisor in the Class I group. Although this difference was found, both groups presented gingival contour values within the acceptable esthetic patterns proposed in literature that ranged from 0.5 to 1 mm.^{2,5,13-15}

Symmetry between sides has been reported as an important characteristic in microesthetics.^{5,12,38} Despite the statistically significant differences found for central incisor width/height symmetry proportion in the Normal Occlusion group, and for the canines width/height symmetry proportion and central incisors gingival zenith in the Class I group (Tables II and III), they were numerically minimal. Then they could be difficult to detect visually and therefore, they may not be perceived as antiesthetic.^{5,12,15,38,42}

The findings of this research showed that few irregularities in microesthetics values may be expected in orthodontically treated patients when compared to the Normal Occlusion patterns. In general, both groups presented similar behavior of the studied variables. It could be thought that in Class I malocclusion patients, orthodontic treatment with four premolar extractions would result in acceptable microesthetics patterns.

This study should be considered the first that compares microesthetics parameters between these specific groups. Future research should be performed including different malocclusions and different treatment protocols.

Conclusions:

The outcomes of this research lead to the following conclusions:

1. Four premolar extractions orthodontic treatment of Class I malocclusion provides similar microesthetic patterns as individuals with normal occlusion;
2. Normal occlusion and Class I malocclusion treated with four premolar extractions in general present symmetric microesthetic characteristics.

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Figure legends:

Fig 1. Insertion of points to measure width (A) and height (B)

Fig 2. Measurement of gingival zenith.

Fig 3. Insertion of points to measure connectors.

Fig 4. Measurement of gingival contour.

Fig 1A and B.

Fig 2.

Fig 3.

Fig 4

Table I. Tooth measurements in the two groups.

Tooth	Class I Mean (SD)	Normal Occlusion Mean (SD)	P
Age			
	15.18 (1.88)	16.93 (6.09)	0.559
OGS			
	33.193 (5.935)	34.322 (5.042)	0.422 [†]
Width/height proportion			
RC	0.868 (0.117)	0.866 (0.125)	0.940 [†]
RLI	0.905 (0.085)	0.841 (0.110)	0.012 ^{*†}
RCI	0.904 (0.074)	0.912 (0.093)	0.681 [†]
LCI	0.893 (0.079)	0.896 (0.102)	0.906 [†]
LLI	0.885 (0.108)	0.820 (0.115)	0.025 [†]
LC	0.844 (0.091)	0.859 (0.109)	0.576 [†]
Gingival Zenith			
RC	0.131 (0.430)	0.263 (0.419)	0.225 [†]
RLI	0.275 (0.557)	0.232 (0.304)	0.705 [†]
RCI	0.416 (0.511)	0.583 (0.361)	0.144 [†]
LCI	0.683 (0.637)	0.618 (0.346)	0.622 [†]
LLI	0.280 (0.417)	0.382 (0.330)	0.291 [†]
LC	0.126 (0.375)	0.272 (0.419)	0.027 ^{*‡}
Connectors			
RC to RLI	2.370 (0.883)	1.985 (0.779)	0.073 [†]
RLI to RCI	3.062 (0.794)	3.423 (1.121)	0.148 [†]
RCI to LCI	4.387 (0.850)	4.579 (1.093)	0.442 [†]
LCI to LLI	3.230 (0.952)	3.527 (0.934)	0.220 [†]
LLI to LC	2.600 (0.792)	2.008 (0.682)	0.002 ^{*†}
Gingival Contour			
Right	1.089 (0.778)	0.653 (0.435)	0.008 ^{*†}
Left	0.985 (0.741)	0.748 (0.441)	0.131 [†]

RC: right canine; RLI: right lateral incisor; RCI: right central incisor; LCI: left central incisor; LLI: left lateral incisor; LC: left canine.

SD standard deviation.

*Statistically significant at $P < 0.05$.

[†]t test

[‡]Mann-Whitney U test.

Table II. Comparison of right and left sides in Class I group.

Tooth	Right Mean (SD)	Left Mean (SD)	P
Width x height proportion			
Canine	0.868 (0.117)	0.844 (0.091)	0.029* [†]
Lateral Incisor	0.905 (0.085)	0.885 (0.108)	0.148 [†]
Central Incisor	0.904 (0.074)	0.893 (0.079)	0.182 [†]
Gingival Zenith			
Canine	0.131 (0.430)	0.126 (0.375)	0.770 [‡]
Lateral Incisor	0.275 (0.557)	0.280 (0.417)	0.955 [†]
Central Incisor	0.416 (0.511)	0.683 (0.637)	0.045* [†]
Connectors			
Canine to Lateral Incisor	2.370 (0.883)	2.600 (0.792)	0.160 [†]
Lateral to Central Incisor	3.062 (0.794)	3.230 (0.952)	0.162 [†]
Gingival Contour			
	0.985 (0.741)	1.089 (0.778)	0.428 [†]

SD standard deviation.

*Statistically significant at $P < 0.05$.

[†]t test

[‡]Mann-Whitney U test.

Table III. Comparison of right and left sides in Normal Occlusion group.

Tooth	Right Mean (SD)	Left Mean (SD)	P
Width/height proportion			
Canine	0.866 (0.125)	0.859 (0.109)	0.598 [†]
Lateral Incisor	0.841 (0.110)	0.820 (0.115)	0.128 [†]
Central Incisor	0.912 (0.093)	0.896 (0.102)	0.043 ^{*†}
Gingival Zenith			
Canine	0.263 (0.419)	0.272 (0.419)	0.490 [‡]
Lateral Incisor	0.232 (0.304)	0.382 (0.330)	0.702 [†]
Central Incisor	0.583 (0.361)	0.618 (0.346)	0.645 [†]
Connectors			
Canine to Lateral Incisor	1.985 (0.779)	2.008 (0.682)	0.834 [†]
Lateral to Central Incisor	3.423 (1.121)	3.527 (0.093)	0.391 [†]
Gingival Contour			
	0.653 (0.435)	0.748 (0.441)	0.212 [†]

SD standard deviation.

*Statistically significant at $P < 0.05$.

[†]t test

[‡]Mann-Whitney U test.

References

1. Sarver D, Jacobson RS. The aesthetic dentofacial analysis. Clinics in plastic surgery 2007;34:369-394.
2. Sarver DM. Principles of cosmetic dentistry in orthodontics: Part 1. Shape and proportionality of anterior teeth. American Journal of Orthodontics and Dentofacial Orthopedics 2004;126:749-753.
3. Sarver D, Ackerman M. Dynamic smile visualization and quantification and its impact on orthodontic diagnosis and treatment planning. The art of smile: integrating Prosthodontics, Orthodontics, Periodontics, Dental Technology and Plastic Surgery. Chicago: Quintessence 2005:99-139.
4. Sarver DM. Enameloplasty and Esthetic Finishing in Orthodontics—Identification and Treatment of Microesthetic Features in Orthodontics Part 1. Journal of Esthetic and Restorative Dentistry 2011;23:296-302.
5. Machado AW. 10 commandments of smile esthetics. Dental press journal of orthodontics 2014;19:136-157.
6. Gillen RJ, Schwartz RS, Hilton TJ, Evans DB. An analysis of selected normative tooth proportions. International Journal of Prosthodontics 1994;7.
7. Kokich VG, Nappen DL, Shapiro PA. Gingival contour and clinical crown length: their effect on the esthetic appearance of maxillary anterior teeth. American journal of orthodontics 1984;86:89-94.
8. Rufenacht CR, Berger RP. Fundamentals of esthetics. Quintessence Chicago, Ill, USA; 1990.

9. Waldrop TC. Gummy smiles: the challenge of gingival excess: prevalence and guidelines for clinical management Seminars in orthodontics: Elsevier; 2008: p. 260-271.
 10. Chiche GJ, Pinault A. Esthetics of anterior fixed prosthodontics. Quintessence Pub Co; 1994.
 11. Orce-Romero A, Iglesias-Linares A, Cantillo-Galindo M, Yañez-Vico R, Mendoza-Mendoza A, Solano-Reina E. Do the smiles of the world's most influential individuals have common parameters? Journal of oral rehabilitation 2013;40:159-170.
 12. Nomura S, Freitas KMS, Silva PPCd, Valarelli FP, Cançado RH, Freitas MRd et al. Evaluation of the attractiveness of different gingival zeniths in smile esthetics. Dental press journal of orthodontics 2018;23:47-57.
 13. Spear FM, Kokich VG. A multidisciplinary approach to esthetic dentistry. Dental Clinics of North America 2007;51:487-505.
 14. Chu SJ, TAN JHP, Stappert CF, Tarnow DP. Gingival zenith positions and levels of the maxillary anterior dentition. Journal of Esthetic and Restorative Dentistry 2009;21:113-120.
 15. Kokich VG. Esthetics: the orthodontic-periodontic restorative connection Seminars in Orthodontics: Elsevier; 1996: p. 21-30.
 16. Brandão RCB, Brandão LBC. Finishing procedures in Orthodontics: dental dimensions and proportions (microesthetics). Dental press journal of orthodontics 2013;18:147-174.
 17. Janson G, Branco NC, Fernandes TMF, Sathler R, Garib D, Lauris JRP. Influence of orthodontic treatment, midline position, buccal corridor and smile arc on smile attractiveness: A systematic review. The Angle orthodontist 2011;81:153-161.
 18. Tauheed S, Shaikh A, Fida M. Microaesthetics of the smile: extraction vs. non-extraction. Journal of the College of Physicians and Surgeons Pakistan 2012;22:230.
 19. Wolfart S, Thormann H, Freitag S, Kern M. Assessment of dental appearance following changes in incisor proportions. European journal of oral sciences 2005;113:159-165.
 20. Câmara CA. Esthetics in Orthodontics: six horizontal smile lines. Dental Press Journal of Orthodontics 2010;15:118-131.
 21. Correa BD, Bittencourt MAV, Machado AW. Influence of maxillary canine gingival margin asymmetries on the perception of smile esthetics among orthodontists and laypersons. American Journal of Orthodontics and Dentofacial Orthopedics 2014;145:55-63.
 22. Pini NP, De-Marchi LM, Gribel BF, Pascotto RC. Digital analysis of anterior dental esthetic parameters in patients with bilateral maxillary lateral incisor agenesis. Journal of Esthetic and Restorative Dentistry 2013;25:189-200.
 23. Knösel M, Jung K. On the relevance of "ideal" occlusion concepts for incisor inclination target definition. American Journal of Orthodontics and Dentofacial Orthopedics 2011;140:652-659.
 24. Andrews LF. The six keys to normal occlusion. American journal of orthodontics 1972;62:296-309.
 25. Dahlberg G. Statistical methods for medical and biological students. Statistical methods for medical and biological students. 1940.
-

26. Massaro C, Miranda F, Janson G, de Almeida RR, Pinzan A, Martins DR et al. Maturational changes of the normal occlusion: A 40-year follow-up. *American Journal of Orthodontics and Dentofacial Orthopedics* 2018;154:188-200.
 27. Pini NP, DE-MARCHI LM, Gribel BF, Ubaldini ALM, Pascotto RC. Analysis of the golden proportion and width/height ratios of maxillary anterior dentition in patients with lateral incisor agenesis. *Journal of Esthetic and Restorative Dentistry* 2012;24:402-414.
 28. Brandt S, Safirstein GR. Different extractions for different malocclusions. *American journal of orthodontics* 1975;68:15-41.
 29. Liang Y-M, Rutchakitprakarn L, Kuang S-H, Wu T-Y. Comparing the reliability and accuracy of clinical measurements using plaster model and the digital model system based on crowding severity. *Journal of the Chinese Medical Association: JCMA* 2018;81:842-847.
 30. Koretsi V, Tingelhoff L, Proff P, Kirschneck C. Intra-observer reliability and agreement of manual and digital orthodontic model analysis. *European journal of orthodontics* 2017;40:52-57.
 31. Casco JS, Vaden JL, Kokich VG, Damone J, James RD, Cangialosi TJ et al. Objective grading system for dental casts and panoramic radiographs. *American Journal of Orthodontics and Dentofacial Orthopedics* 1998;114:589-599.
 32. Miranda F, Massaro C, Janson G, de Freitas MR, Henriques JFC, Lauris JRP et al. Aging of the normal occlusion. *European journal of orthodontics* 2018;1:8.
 33. Janson G, Junqueira CHZ, Mendes LM, Garib DG. Influence of premolar extractions on long-term adult facial aesthetics and apparent age. *European journal of orthodontics* 2015;38:272-280.
 34. Li W, Wang S, Zhang Y. The effectiveness of the Invisalign appliance in extraction cases using the the ABO model grading system: a multicenter randomized controlled trial. *International journal of clinical and experimental medicine* 2015;8:8276.
 35. Struble BH, Huang GJ. Comparison of prospectively and retrospectively selected American Board of Orthodontics cases. *American Journal of Orthodontics and Dentofacial Orthopedics* 2010;137:6. e1-6. e8.
 36. Morrow L, Robbins J, Jones D, Wilson N. Clinical crown length changes from age 12–19years: a longitudinal study. *Journal of dentistry* 2000;28:469-473.
 37. Paulino V, Paredes V, Cibrian R, Gandia J-L. Tooth size changes with age in a Spanish population: percentile tables. *group* 2011;2:3.
 38. Machado RM, Duarte MEA, da Motta AFJ, Mucha JN, Motta AT. Variations between maxillary central and lateral incisal edges and smile attractiveness. *American Journal of Orthodontics and Dentofacial Orthopedics* 2016;150:425-435.
 39. Majzoub ZA, Romanos A, Cordioli G. Crown lengthening procedures: a literature review *Seminars in Orthodontics: Elsevier*; 2014: p. 188-207.
 40. Wolffe GN, van der Weijden FA, Spanauf AJ, de Quincey GN. Lengthening clinical crowns--a solution for specific periodontal, restorative, and esthetic problems. *Quintessence International* 1994;25.
 41. Goodlin R. COSMETIC DENTISTRY-Gingival Aesthetics--A Critical Factor in Smile Design. *Oral Health* 2003;93:10-28.
 42. Fernandes L, Pinho T. Esthetic evaluation of dental and gingival asymmetries. *International orthodontics* 2015;13:221-231.
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3 DISCUSSION

3 DISCUSSION

Microesthetics is a field commonly studied in specialties such as prosthodontics, periodontics, restorative dentistry and nowadays in orthodontics. Although the patterns established in previous researches do not focus in a natural normal occlusion or in different malocclusions daily treated in orthodontics. (SARVER, 2004; SARVER; JACOBSON, 2007; CHU et al., 2009; PINI et al., 2012; PINI et al., 2013) The knowledge of possible differences in patterns of microesthetics related to different occlusions is especially important during treatment finalizing phase.

Normal occlusion was used in this study because do not need orthodontic intervention, so it is a natural gold standard in this specialty. In contrast is considered as Angle Class I malocclusion that one with correct sagittal relation in dental arches, but also with dental rotation, diastema, crowding or other occlusion alterations with orthodontic treatment need. (KATZ, 1992) Theoretically is an easier treatment than other malocclusion. In most cases dental mechanic in Class I treated with four premolars requires less anterior movement than Class II or III, which reduces the chances of relapse. (ALI; SHAIKH; FIDA, 2018)

In relation to error study, higher values of random error in gingival zenith were shown in the error study due to the measurement protocol adopted to these variables, which that classified as positive numerical values gingival zeniths positioned distally to the center of long axis of each tooth, likewise negative values were attributed to gingival zeniths positioned mesially to the center. This protocol was adopted based on previous studies that considered as esthetically pleasant gingival zenith located in center of long axis or distally to it. (SARVER; JACOBSON, 2007; CHU et al., 2009; PINI et al., 2012; PINI et al., 2013)

It was found an OGS of 34.322 and 33.193 in Normal Occlusion and Class I group respectively, which is considered high through OGS ABO reference but is in accordance to previous articles published. (JANSON et al., 2015; MIRANDA et al., 2018) The OGS index it is been widely applied in recent studies due to consists in a tool of orthodontic treatment finalizing quality that involves eight clinical important patterns in this phase. (CASCO et al., 1998) Originally it is applied only to treated

cases, although in the present study Class I group were also analyzed in order to enable the comparison between the two groups in relation to quality of occlusion.

Higher dental proportion in anterior upper teeth was found in both groups in relation to previous researches, which consequently showed larger dental crowns in the present sample (Table IV). (GILLEN et al., 1994; PINI et al., 2013) It was related in studies about this subject that orthodontic treatment might influence width x height proportion after intrusion/extrusion movements or even in association to periodontal alteration, but based in present results this association was not found. (JOSS-VASSALLI et al., 2010; BRANDÃO; BRANDÃO, 2013; SAWAN et al., 2018)

A distal position regarding to gingival zenith was found in all upper anterior tooth, which was partially similar to previous outcomes (Table IV). (RUFENACHT; BERGER, 1990; SARVER, 2004; CHU et al., 2009) In general, it is accepted a distal position in central incisor and canine while in lateral incisor gingival zenith is presented in the center of dental crown long axis. (RUFENACHT; BERGER, 1990; SARVER, 2004; CHU et al., 2009; MACHADO, 2014)

It was found different gingival connectors height in the present study in relation to previously established (SARVER, 2004; SPEAR; KOKICH, 2007; CHU et al., 2009) but it was maintained the progressively decrease of this variable from anterior to posterior teeth. Usually the connector between upper central incisors presents 50% of these teeth height, while 40% of upper central incisor height is accepted in central incisors to lateral incisors connectors, and 30% of this height should be found between lateral incisor to canine. (SARVER, 2004; SPEAR; KOKICH, 2007; CHU et al., 2009)

Orthodontic treatment might also influence in gingival contour measurements. (KOKICH; NAPPEN; SHAPIRO, 1984; KOKICH, 1996; SARVER, 2004; SPEAR; KOKICH, 2007; CHU et al., 2009) In the present research the gingival contour upper lateral incisor was statistically greater in Class I group in relation to Normal Occlusion group (Table IV) Despite this difference, it was found gingival contour measures similar to previously described (from 0.5 to 1mm). (KOKICH, 1996; SPEAR; KOKICH, 2007; CHU et al., 2009; MACHADO, 2014)

Regarding to symmetry statistically significant differences were found in some variables, although they might not be considered as antiesthetic because the differences are clinically difficult to detect. (MACHADO, 2014; MACHADO et al., 2016;

NOMURA et al., 2018) Finally, it was observed after these measurements that some differences in microesthetics values are often present after orthodontic finishing in relation to Normal Occlusion individuals, but the results are also considered as acceptable to treated group.

4 CONCLUSIONS

4 CONCLUSIONS

The outcomes of this research lead to the following conclusions:

1. Four premolar extractions orthodontic treatment of Class I malocclusion provides similar microesthetic patterns as individuals with normal occlusion;
2. Normal occlusion and Class I malocclusion treated with four premolar extractions generally present symmetric microesthetic characteristics.

REFERENCES

REFERENCES

Abizadeh N, Moles DR, O'Neill J, Noar JH. Digital versus plaster study models: how accurate and reproducible are they? *Journal of orthodontics*. 2012 39(3):151-9.

Ali B, Shaikh A, Fida M. Factors affecting treatment decisions for Class I malocclusions. *American journal of orthodontics and dentofacial orthopedics*. 2018 154(2):234-7.

Brandão RCB, Brandão LBC. Finishing procedures in Orthodontics: dental dimensions and proportions (microesthetics). *Dental press journal of orthodontics*. 2013 18(5):147-74.

Câmara CA. Esthetics in Orthodontics: six horizontal smile lines. *Dental Press Journal of Orthodontics*. 2010 15(1):118-31.

Casko JS, Vaden JL, Kokich VG, Damone J, James RD, Cangialosi TJ, et al. Objective grading system for dental casts and panoramic radiographs. *American Journal of Orthodontics and Dentofacial Orthopedics*. 1998 114(5):589-99.

Chiche GJ, Pinault A. Esthetics of anterior fixed prosthodontics: Quintessence Pub Co; 1994.

Chu SJ, TAN JHP, Stappert CF, Tarnow DP. Gingival zenith positions and levels of the maxillary anterior dentition. *Journal of Esthetic and Restorative Dentistry*. 2009 21(2):113-20.

Eduarda Assad Duarte M, Martins Machado R, Fonseca Jardim da Motta A, Nelson Mucha J, Trindade Motta A. Morphological Simulation of Different Incisal Embrasures: Perception of Laypersons, Orthodontic Patients, General Dentists and Orthodontists. *Journal of Esthetic and Restorative Dentistry*. 2017 29(1):68-78.

Fleming P, Marinho V, Johal A. Orthodontic measurements on digital study models compared with plaster models: a systematic review. *Orthodontics & craniofacial research*. 2011 14(1):1-16.

Gillen RJ, Schwartz RS, Hilton TJ, Evans DB. An analysis of selected normative tooth proportions. *International Journal of Prosthodontics*. 1994 7(5):

Grewal B, Lee RT, Zou L, Johal A. Royal London space analysis: plaster versus digital model assessment. *European journal of orthodontics*. 2016 39(3):320-5.

Gürel G, Gürel G. *The science and art of porcelain laminate veneers*: Quintessence London; 2003.

Janson G, Branco NC, Fernandes TMF, Sathler R, Garib D, Lauris JRP. Influence of orthodontic treatment, midline position, buccal corridor and smile arc on smile attractiveness: A systematic review. *The Angle orthodontist*. 2011 81(1):153-61.

Janson G, Junqueira CHZ, Mendes LM, Garib DG. Influence of premolar extractions on long-term adult facial aesthetics and apparent age. *European journal of orthodontics*. 2015 38(3):272-80.

Joss-Vassalli I, Grebenstein C, Topouzelis N, Sculean A, Katsaros C. Orthodontic therapy and gingival recession: a systematic review. *Orthodontics & craniofacial research*. 2010 13(3):127-41.

Katz MI. Angle classification revisited 2: a modified Angle classification. *American Journal of Orthodontics and Dentofacial Orthopedics*. 1992 102(3):277-84.

Kokich VG, editor *Esthetics: the orthodontic-periodontic restorative connection*. *Seminars in Orthodontics*; 1996: Elsevier.

Kokich VG, Nappen DL, Shapiro PA. Gingival contour and clinical crown length: their effect on the esthetic appearance of maxillary anterior teeth. *American journal of orthodontics*. 1984 86(2):89-94.

Machado AW. 10 commandments of smile esthetics. *Dental press journal of orthodontics*. 2014 19(4):136-57.

Machado RM, Duarte MEA, da Motta AFJ, Mucha JN, Motta AT. Variations between maxillary central and lateral incisal edges and smile attractiveness. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2016 150(3):425-35.

Miranda F, Massaro C, Janson G, de Freitas MR, Henriques JFC, Lauris JRP, et al. Aging of the normal occlusion. *European journal of orthodontics*. 2018 1(8).

Morley J, Eubank J. Macroesthetic elements of smile design. *The Journal of the American Dental Association*. 2001 132(1):39-45.

Nomura S, Freitas KMS, Silva PPCd, Valarelli FP, Cançado RH, Freitas MRd, et al. Evaluation of the attractiveness of different gingival zeniths in smile esthetics. *Dental press journal of orthodontics*. 2018 23(5):47-57.

Oliveira PLE, Motta AFJd, Guerra CJ, Mucha JN. Comparison of two scales for evaluation of smile and dental attractiveness. *Dental press journal of orthodontics*. 2015 20(2):42-8.

Pini NP, De-Marchi LM, Gribel BF, Pascotto RC. Digital analysis of anterior dental esthetic parameters in patients with bilateral maxillary lateral incisor agenesis. *Journal of Esthetic and Restorative Dentistry*. 2013 25(3):189-200.

Pini NP, DE-MARCHI LM, Gribel BF, Ubaldini ALM, Pascotto RC. Analysis of the golden proportion and width/height ratios of maxillary anterior dentition in patients with lateral incisor agenesis. *Journal of Esthetic and Restorative Dentistry*. 2012 24(6):402-14.

Rufenacht CR, Berger RP. *Fundamentals of esthetics*: Quintessence Chicago, Ill, USA; 1990.

Sarver D, Ackerman M. Dynamic smile visualization and quantification and its impact on orthodontic diagnosis and treatment planning. *The art of smile: integrating Prosthodontics, Orthodontics, Periodontics, Dental Technology and Plastic Surgery* Chicago: Quintessence. 2005 99-139.

Sarver D, Jacobson RS. The aesthetic dentofacial analysis. *Clinics in plastic surgery*. 2007 34(3):369-94.

Sarver DM. Principles of cosmetic dentistry in orthodontics: Part 1. Shape and proportionality of anterior teeth. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2004 126(6):749-53.

Sarver DM. Enameloplasty and Esthetic Finishing in Orthodontics—Identification and Treatment of Microesthetic Features in Orthodontics Part 1. *Journal of Esthetic and Restorative Dentistry*. 2011 23(5):296-302.

Sarver DM, Ackerman MB. Dynamic smile visualization and quantification: part 1. Evolution of the concept and dynamic records for smile capture. *American journal of orthodontics and dentofacial orthopedics*. 2003 124(1):4-12.

Sawan NM, Ghoneima A, Stewart K, Liu S. Risk factors contributing to gingival recession among patients undergoing different orthodontic treatment modalities. *Interventional Medicine and Applied Science*. 2018 10(1):19-26.

Spear FM, Kokich VG. A multidisciplinary approach to esthetic dentistry. *Dental Clinics of North America*. 2007 51(2):487-505.

Sterrett JD, Oliver T, Robinson F, Fortson W, Knaak B, Russell CM. Width/length ratios of normal clinical crowns of the maxillary anterior dentition in man. *Journal of clinical periodontology*. 1999 26(3):153-7.

Tauheed S, Shaikh A, Fida M. Microaesthetics of the smile: extraction vs. non-extraction. *Journal of the College of Physicians and Surgeons Pakistan*. 2012 22(4):230.

Waldrop TC, editor *Gummy smiles: the challenge of gingival excess: prevalence and guidelines for clinical management*. *Seminars in orthodontics*; 2008: Elsevier.

Wolfart S, Thormann H, Freitag S, Kern M. Assessment of dental appearance following changes in incisor proportions. *European journal of oral sciences*. 2005 113(2):159-65.

APPENDIX

**APPENDIX A - DECLARATION OF EXCLUSIVE USE OF THE ARTICLE IN
DISSERTATION/THESIS**

We hereby declare that we are aware of the article "COMPARISON OF MICROESTHETIC PATTERNS IN NORMAL OCCLUSION IN RELATION TO CLASS I MALOCCLUSION TREATED WITH EXTRACTIONS OF FOUR PREMOLARS" will be included in Dissertation of the student Olga Benário Vieira Maranhão and may not be used in other works of Graduate Programs at the Bauru School of Dentistry, University of São Paulo.

Bauru, December 1st, 2018.

Olga Benário Vieira Maranhão
Author

Signature

Guilherme Janson
Author

Signature

Author

Signature

Author

Signature

ANNEXES

ANNEX A. Ethics Committee approval, protocol number 84325318.2.0000.5417 (front).

USP - FACULDADE DE
ODONTOLOGIA DE BAURU DA
USP

PARECER CONSUBSTANCIADO DO CEP**DADOS DO PROJETO DE PESQUISA**

Título da Pesquisa: Análise de padrões da micro-estética na oclusão normal

Pesquisador: Olga Benário Vieira Maranhão

Área Temática:

Versão: 3

CAAE: 84325318.2.0000.5417

Instituição Proponente: Faculdade de Odontologia de Bauru

Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 2.768.120

Apresentação do Projeto:

Idem parecer 2.566.803

Objetivo da Pesquisa:

Idem parecer 2.566.803

Avaliação dos Riscos e Benefícios:

Idem parecer 2.566.803

Comentários e Considerações sobre a Pesquisa:

Idem parecer 2.566.803

Considerações sobre os Termos de apresentação obrigatória:

Idem parecer 2.566.803

Recomendações:

Sem recomendações. As modificações foram acatadas pelo pesquisador.

Conclusões ou Pendências e Lista de Inadequações:

Sugiro aprovação.

Considerações Finais a critério do CEP:

Esse projeto foi considerado APROVADO na reunião extraordinária do CEP de 04/07/2018, com base nas normas éticas da Resolução CNS 466/12. Ao término da pesquisa o CEP-FOB/USP exige a apresentação de relatório final. Os relatórios parciais deverão estar de acordo com o cronograma

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ANNEX A. Ethics Committee approval, protocol number 84325318.2.0000.5417 (front).

USP - FACULDADE DE
ODONTOLOGIA DE BAURU DA
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Continuação do Parecer: 2.768.120

e/ou parecer emitido pelo CEP. Alterações na metodologia, título, inclusão ou exclusão de autores, cronograma e quaisquer outras mudanças que sejam significativas deverão ser previamente comunicadas a este CEP sob risco de não aprovação do relatório final. Quando da apresentação deste, deverão ser incluídos todos os TCLEs e/ou termos de doação assinados e rubricados, se pertinentes.

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações Básicas do Projeto	PB_INFORMAÇÕES_BÁSICAS_DO_PROJETO_1063896.pdf	14/06/2018 21:14:28		Aceito
Declaração de Instituição e Infraestrutura	Autorizacao_arquivo.pdf	14/06/2018 21:13:43	Olga Benário Vieira Maranhão	Aceito
Projeto Detalhado / Brochura Investigador	Projeto.docx	09/06/2018 17:54:07	Olga Benário Vieira Maranhão	Aceito
Folha de Rosto	Folhaderosto.pdf	18/04/2018 21:04:52	Olga Benário Vieira Maranhão	Aceito
Outros	2_Questionario_Tecnico_Pesquisador.pdf	22/02/2018 20:36:26	Olga Benário Vieira Maranhão	Aceito
Outros	5_Carta_de_encaminhamento.pdf	22/02/2018 20:24:29	Olga Benário Vieira Maranhão	Aceito
Declaração de Pesquisadores	3_DeclaracaoCompromissoPesquisador ResultadosPesquisa.pdf	22/02/2018 20:24:08	Olga Benário Vieira Maranhão	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	4_Dispensa_TCLE.pdf	22/02/2018 20:23:04	Olga Benário Vieira Maranhão	Aceito

Situação do Parecer:

Aprovado

Necessita Apreciação da CONEP:

Não

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ANNEX A. Ethics Committee approval, protocol number 84325318.2.0000.5417 (verse).

USP - FACULDADE DE
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Continuação do Parecer: 2.768.120

BAURU, 12 de Julho de 2018

Assinado por:
Ana Lúcia Pompéia Fraga de Almeida
(Coordenador)

Endereço: DOUTOR OCTAVIO PINHEIRO BRISOLLA 75 QUADRA 9
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ANNEX B. Amendment send to Ethics Committee approval, protocol number 84325318.2.0000.5417 (front).

**Universidade de São Paulo
Faculdade de Odontologia de Bauru**

Departamento de Odontopediatria, Ortodontia e
Saúde Coletiva

Bauru, 17 de Setembro de 2018

Senhora Coordenadora,

Encaminho ao Comitê de Ética em Pesquisa a Emenda do Projeto de Pesquisa "Comparação dos padrões de micro-estética na oclusão normal em relação à Classe I tratada com extrações de quatro pré-molares" (CAAE: 84325318.2.0000.5417; Número do parecer: 2.768.120) de autoria de Olga Benário Vieira Maranhão, sob a orientação do Prof. Dr. Guilherme Janson.

A justificativa desta emenda baseia-se em alterações realizadas no projeto:

1-Mudança do título do projeto que passará a se intitular: **Comparação dos padrões de micro-estética na oclusão normal em relação à Classe I tratada com extrações de quatro pré-molares**

2-Inclusão de **48 indivíduos** correspondentes a um novo grupo da amostra não inserido inicialmente no projeto.

A pesquisa tem como objetivo avaliar os parâmetros quantitativos relacionados à micro-estética dos dentes ântero-superiores em indivíduos com oclusão normal e compará-los com os padrões obtidos em pacientes com má oclusão de Classe I tratados ortodonticamente com extração de quatro pré-molares.

Como parte da documentação solicitada por este Colegiado para a avaliação de projetos de pesquisas envolvendo seres humanos, declaramos que as alterações realizadas no projeto não afetarão de maneira significativa a metodologia descrita anteriormente, já que a forma de medição aplicada ao grupo inicial também será desenvolvida no grupo inserido atualmente. Essa alteração teve como objetivo tornar a pesquisa mais completa e os resultados mais detalhados. Consequentemente à inserção de um novo grupo, o título também sofreu alterações com o intuito de corresponder às alterações no estudo.

Atenciosamente,

Olga Benário Vieira Maranhão
Pesquisador Principal

Guilherme Janson
Orientador

Profª Drª Ana Lúcia Pompéia Fraga de Almeida
Coordenadora do Comitê de Ética em Pesquisa-FOB-USP

ANNEX C. Ethics Committee approval (after amendment), protocol number 84325318.2.0000.5417 (front).

USP - FACULDADE DE
ODONTOLOGIA DE BAURU DA
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PARECER CONSUBSTANCIADO DO CEP**DADOS DA EMENDA**

Título da Pesquisa: Comparação dos padrões de micro-estética na oclusão normal em relação à Classe I tratada com extrações de quatro pré-molares

Pesquisador: Olga Benário Vieira Maranhão

Área Temática:

Versão: 4

CAAE: 84325318.2.0000.5417

Instituição Proponente: Faculdade de Odontologia de Bauru

Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 2.976.844

Apresentação do Projeto:

idem ao parecer nº 2.768.120, com emenda de inclusão de 48 pacientes com maloclusão classe I, e mesma metodologia utilizada no projeto aprovado por este CEP.

Objetivo da Pesquisa:

idem ao parecer nº 2.768.120, com emenda de inclusão de 48 pacientes com maloclusão classe I, e mesma metodologia utilizada no projeto aprovado por este CEP.

Avaliação dos Riscos e Benefícios:

idem ao parecer nº 2.768.120, com emenda de inclusão de 48 pacientes com maloclusão classe I, e mesma metodologia utilizada no projeto aprovado por este CEP.

Comentários e Considerações sobre a Pesquisa:

idem ao parecer nº 2.768.120, com emenda de inclusão de 48 pacientes com maloclusão classe I, e mesma metodologia utilizada no projeto aprovado por este CEP. Com mudança do título da pesquisa por ter comparação entre indivíduos com oclusão normal.

Considerações sobre os Termos de apresentação obrigatória:

A emenda foi inserida na PB, assim como as alterações no projeto, folha de rosto.

Conclusões ou Pendências e Lista de Inadequações:

Aprovado

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ANNEX C. Ethics Committee approval, protocol number 84325318.2.0000.5417 (front).

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Continuação do Parecer: 2.976.844

Considerações Finais a critério do CEP:

A emenda apresentada pelo(a) pesquisador(a) foi considerada APROVADA na reunião ordinária do CEP de 10/10/2018, com base nas normas éticas da Resolução CNS 466/12. Ao término da pesquisa o CEP-FOB/USP exige a apresentação de relatório final. Os relatórios parciais deverão estar de acordo com o cronograma e/ou parecer emitido pelo CEP. Alterações na metodologia, título, inclusão ou exclusão de autores, cronograma e quaisquer outras mudanças que sejam significativas deverão ser previamente comunicadas a este CEP sob risco de não aprovação do relatório final. Quando da apresentação deste, deverão ser incluídos todos os TCLEs e/ou termos de doação assinados e rubricados, se pertinentes.

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações Básicas do Projeto	PB_INFORMAÇÕES_BÁSICAS_1221427_E1.pdf	19/09/2018 19:13:18		Aceito
Outros	3_Carta_Emenda.pdf	19/09/2018 19:11:53	Olga Benário Vieira Maranhão	Aceito
Projeto Detalhado / Brochura Investigador	2_Projeto_alterado.pdf	19/09/2018 19:11:25	Olga Benário Vieira Maranhão	Aceito
Folha de Rosto	1_Folha_de_rosto.pdf	19/09/2018 19:10:44	Olga Benário Vieira Maranhão	Aceito
Declaração de Instituição e Infraestrutura	Autorizacao_arquivo.pdf	14/06/2018 21:13:43	Olga Benário Vieira Maranhão	Aceito
Outros	2_Questionario_Tecnico_Pesquisador.pdf	22/02/2018 20:36:26	Olga Benário Vieira Maranhão	Aceito
Outros	5_Carta_de_encaminhamento.pdf	22/02/2018 20:24:29	Olga Benário Vieira Maranhão	Aceito
Declaração de Pesquisadores	3_DeclaracaoCompromissoPesquisador ResultadosPesquisa.pdf	22/02/2018 20:24:08	Olga Benário Vieira Maranhão	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	4_Dispenza_TCLE.pdf	22/02/2018 20:23:04	Olga Benário Vieira Maranhão	Aceito

Situação do Parecer:

Aprovado

Necessita Apreciação da CONEP:

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ANNEX C. Ethics Committee approval, protocol number 84325318.2.0000.5417 (verse).

USP - FACULDADE DE
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USP

Continuação do Parecer: 2.976.844

Não

BAURU, 23 de Outubro de 2018

Assinado por:

Ana Lúcia Pompéia Fraga de Almeida
(Coordenador(a))

Endereço: DOUTOR OCTAVIO PINHEIRO BRISOLLA 75 QUADRA 9

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ANNEX D. Patient's informed consent exoneration (front)

Universidade de São Paulo
Faculdade de Odontologia de Bauru
Departamento Odontopediatria, Ortodontia e Saúde Coletiva
Disciplina de Ortodontia

DISPENSA DE TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO E TERMO DE ASSENTIMENTO

Solicitamos ao Comitê de Ética em Pesquisa, FOB-USP, a dispensa do Termo de Consentimento Livre e Esclarecido e Termo de Assentimento, do projeto de pesquisa **"Análise de padrões da micro-estética na oclusão normal"**, de autoria de *Olga Benário Vieira Maranhão* sob a orientação do *Prof. Dr. Guilherme Janson*.

Tal solicitação justifica-se pelo fato da amostra ser retrospectiva. Os prontuários estão sob os cuidados da disciplina de Ortodontia do Departamento de Odontopediatria, Ortodontia e Saúde Coletiva. Estes prontuários são do acervo desde 1973, constituindo uma dificuldade o contato com os pacientes devido ao tempo decorrido desde o tratamento feito até a data presente. Vale ressaltar que os pacientes, quando atendidos da clínica de Ortodontia, assinam a **"AUTORIZAÇÃO PARA DIAGNÓSTICO E/OU EXECUÇÃO DE TRATAMENTO ORTODÔNTICO"** a qual aprova tanto a execução do tratamento quanto seu uso para "quaisquer fins de ensino e de divulgação em jornais e/ou revistas científicas do país e do exterior", desta forma aprova-se também o uso dos dados do seu prontuário para o ensino em pesquisas científicas.

A dispensa do termo de Assentimento se deve ao fato de os pacientes da amostra, no momento da execução do exame, serem tanto menor de 18 anos quanto adultos, não sendo diferenciado para a pesquisa, como critério de inclusão ou exclusão. Tais pacientes também foram autorizados pelo responsável no documento **"AUTORIZAÇÃO PARA DIAGNÓSTICO E/OU EXECUÇÃO DE TRATAMENTO ORTODÔNTICO"**. Os nomes e dados pessoais dos pacientes não serão divulgados em nenhum momento, mantendo desta forma o sigilo profissional (Artigo 9º do Código de Ética Odontológico) e a privacidade dos participantes da pesquisa durante todas as fases e assumimos o compromisso de cumprir as exigências contidas na Resolução CNS Nº 466, de 12.12.12.

Bauru, 09 de fevereiro de 2018.

Olga Benário Vieira Maranhão
Orientada

Prof. Dr. Guilherme Janson
Orientador

Al. Dr. Octávio Pinheiro Brisolla, 9-75 – Bauru-SP – CEP 17012-901 – C.P. 73
e-mail: veragato@fob.usp.br – Fone (0xx14) 3235-8217 – Fax (0xx14) 3223-4679
<http://www.fob.usp.br>

ANNEX D. Patient's informed consent exoneration (verse)

**UNIVERSIDADE DE SÃO PAULO
FACULDADE DE ODONTOLOGIA DE BAURU
CLÍNICA DE ORTODONTIA**

**AUTORIZAÇÃO PARA DIAGNÓSTICO E/OU EXECUÇÃO DE
TRATAMENTO ORTODÔNTICO**

Por este instrumento de autorização por mim assinado, dou pleno consentimento à FACULDADE DE ODONTOLOGIA DE BAURU-USP para, por intermédio de seus professores, assistentes e alunos devidamente autorizados, fazer diagnóstico, planejamento e tratamento em minha pessoa ou meu filho menor de idade _____, de acordo com os conhecimentos enquadrados no campo dessa especialidade.

Concordo também, que todas radiografias, fotografias, modelos, desenhos, históricos de antecedentes familiares, resultados de exames clínico e de laboratório e quaisquer outras informações concernentes ao planejamento de diagnóstico e/ou tratamento, constituem propriedade exclusiva desta FACULDADE, à qual dou plenos direitos de retenção, uso para quaisquer fins de ensino e de divulgação em jornais e/ou revistas científicas do país e do exterior.

Bauru, ____ de _____ de 19 ____.

Assinatura do paciente ou responsável

R.G. Nº: _____

Nome: _____

Endereço: _____

CEP: _____ Telefone: _____